

## Rock Cycle

The activity adapted from: <http://www.cotf.edu/ete/modules/msese/earthsysflr/rock.html>

### Goals:

1. Understand the rock cycle
2. Create comfortable class environment.
3. Encourage group work.
4. Encourage students to set-up experiment based on written directions.
5. Presenting the students with hands-on activity.

### Objectives:

Students will be able to:

1. Understand the rock cycle.
2. Understand that heating, cooling, and pressure play important roles in formation of different types of rocks.
3. Learn the types of rocks and how they form.
4. Learn that the rock cycle never stops.

### Materials:

1. Student Worksheets 1, 2, and 3 for each student.
2. Markers(green, yellow, red, blue, purple).
3. Safety glasses for each student.
4. A hand lens for each group.
5. A sugar cube for each group.
6. A piece of foil for each group.
7. A jar candle for each group.

### NJCCCS:

5.1.8.A.1, 5.1.8.B.2,3, 5.7.8.A.1,2, 5.7.8.B.3.

### Activities and Procedures:

#### *Day 1*

1. Discuss with students the word “cycle”. What cycles have they learned about? If they don't mention the water cycle, review it with them.
2. Talk about other cycles, for example, “clothes cycle” from wearing, washing, drying, ironing, and wearing again.
3. Divide the class into four groups and provide a “cloth cycle” card to each group.
4. Each group has one of the cards, “wearing”, “washing”, “drying”, and “ironing”. Have them make a circle to represent the “cloth cycle”.
5. Have the students push their hands together very hard and feel the heat.
6. Have the students rub their hands together and feel the heat.

7. Provide each student with Student Worksheet 1 (Information about the rock cycle) and Student Worksheet 2 (The Rock Cycle Chart).
8. Have volunteer students read the Student Worksheet 1 out loud.
9. Have the students take a look at the rock cycle chart as the Student Worksheet 1 is being read and color the arrows by the given code.
10. Discuss the rock cycle.

#### *Day 2*

1. Divide the student into groups (2-3 students in a group).
2. Provide each group with a sugar cube, a piece of foil, a jar candle, hand lens, safety glasses.
3. Hand out the Student Worksheet 3 (directions to stimulate the changes that occur during the rock cycle).
4. Have the students follow the directions, do the activity, and answer the questions on the worksheet..
5. When they are done with the activity, have a brief conversation about their findings.

#### **Accommodations:**

Hand out the student worksheets the day before the activity.

#### **Assessment:**

Have the students describe in their own words how the rock cycle works.  
Collect the worksheet and check their answers.

## **Student Worksheet 1**

**Student:**

**Date:**

**The Rock Cycle** is a group of changes. Igneous rock can change into sedimentary rock or into metamorphic rock. Sedimentary rock can change into metamorphic rock or into igneous rock. Metamorphic rock can change into igneous or sedimentary rock. Igneous rock forms when magma cools and makes crystals. Magma is a hot liquid made of melted minerals. The minerals can form crystals when they cool. Igneous rock can form underground, where the magma cools slowly. Or, igneous rock can form above ground, where the magma cools quickly.

When it pours out on Earth's surface, magma is called lava. Yes, the same liquid rock matter that you see coming out of volcanoes.

On Earth's surface, wind and water can break rock into pieces. They can also carry rock pieces to another place. Usually, the rock pieces, called sediments, drop from the wind or water to make a layer. The layer can be buried under other layers of sediments. After a long time the sediments can be cemented together to make sedimentary rock. In this way, igneous rock can become sedimentary rock.

All rocks can be heated. But where does the heat come from? Inside Earth there is heat from pressure (push your hands together very hard and feel the heat). There is heat from friction (rub your hands together and feel the heat). There is also heat from radioactive decay (the process that gives us nuclear power plants that make electricity).

So, what does the heat do to the rock? It bakes the rock.

Baked rock does not melt, but it does change. It forms crystals. If it has crystals already, it forms larger crystals. Because this rock changes, it is called metamorphic. Remember that a caterpillar changes to become a butterfly. That change is called metamorphosis. Metamorphosis can occur in rock when they are heated to 300 to 700 degrees Celsius.

When Earth's tectonic plates move around, they produce heat. When they collide, they build mountains and metamorphose (met-ah-MORE-foes) the rock.

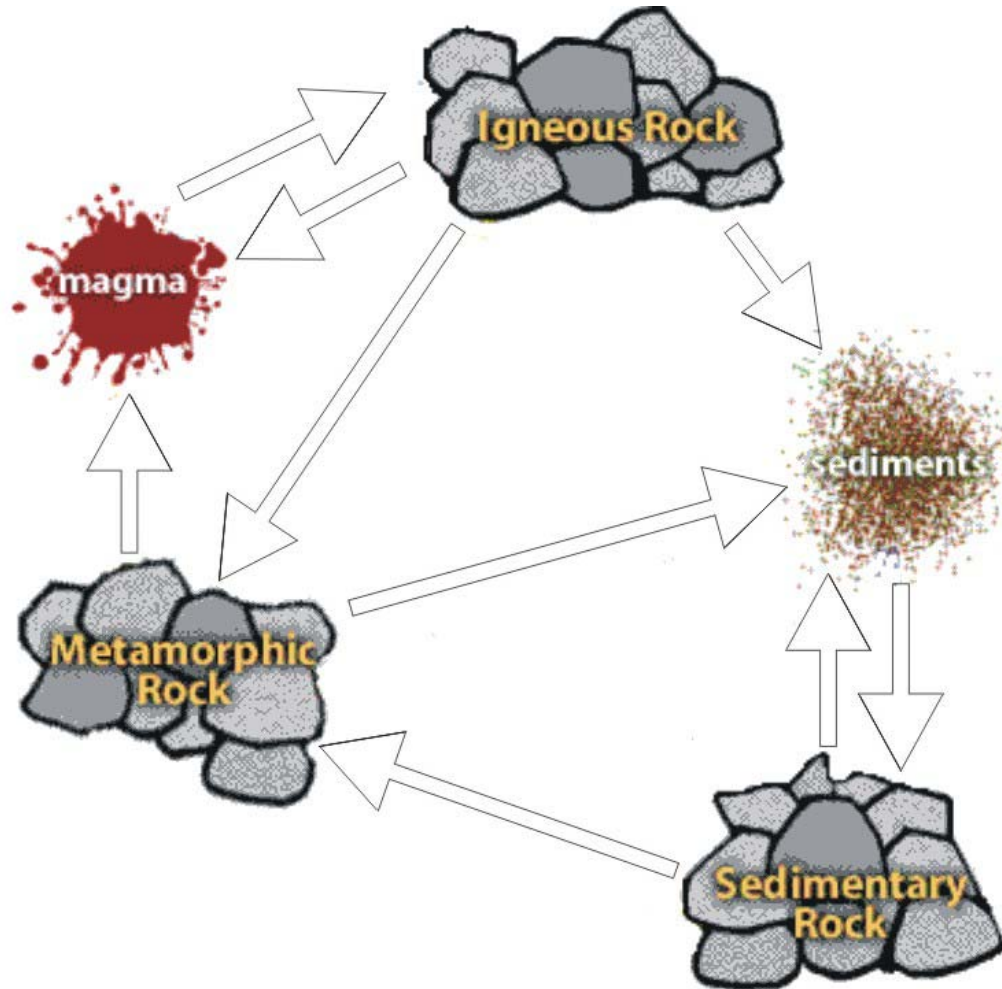
The rock cycle continues. Mountains made of metamorphic rocks can be broken up and washed away by streams. New sediments from these mountains can make new sedimentary rock.

The rock cycle never stops.

## Student Worksheet 2

Student:

Date:



Color the arrows by the given color-code:

Weathering and erosion- green

Heat and pressure- yellow

Melting- red

Cooling- blue

Compaction and cementation- purple

## Student Worksheet 3

**Student:**

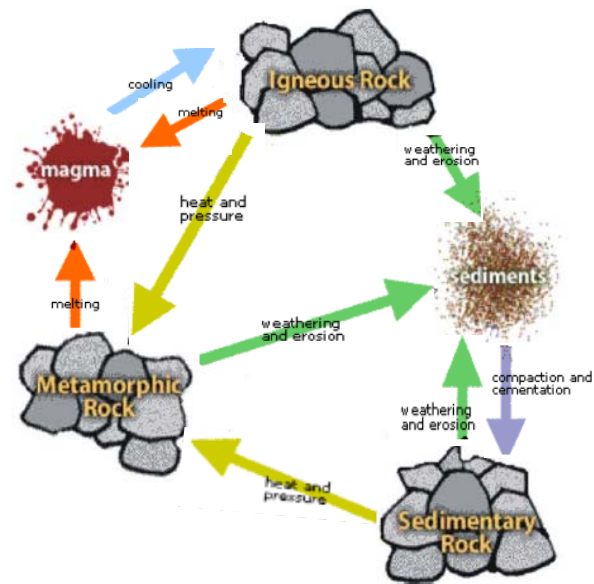
**Date:**

**Directions to simulate the changes that occur during the rock cycle**

1. Examine the sugar cube with a hand lens. How is the sugar cube like sedimentary rock?
2. Crush the sugar cube into a powder. What part of the rock cycle does this represent?
3. Make a “boat” with your foil. Pour the crushed sugar into the foil boat. What part of the rock cycle does this movement represent?

- Carefully put the “boat” over the candle flame. Observe as the sugar begins to melt. What part of the rock cycle does this represent?
- Set the foil boat away from the flame and wait 2-3 minutes. What happened to the melted sugar? What part of the rock cycle does this represent?
- Break the hardened sugar into pieces. What part of the rock cycle does this represent?

**For the Teacher:**



Color the arrows by the given color-code:

Weathering and erosion- green

Heat and pressure- yellow

Melting- red

Cooling- blue

Compaction and cementation- purple